Exploration musculaire isocinétique dans la sclérose en plaques : épreuves de force et de fatigabilité

Isokinetic strength and fatigability in patients with multiple sclerosis

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Introduction

Multiple sclerosis (MS) is a chronic disease characterized by inflammation and demyelisation of the central nervous system. Decline of muscular performances, fatigue, weakness and spasticity are the most common and disabling symptoms characterizing this neurological disease.

Objective assessments of muscle function would be relevant to track the evolution of disease and help to appreciate the effectiveness of treatments.

The purposes of this study were to assess muscle strength and fatigue of knee flexors and extensors in patients with multiple sclerosis by means of an isokinetic dynamometer. Relations between isokinetic results and gait speed were also investigated.

Methods

Eleven patients (46 ± 9 years old) suffering from multiple sclerosis (with unaided gait) and fifteen control women (46 ± 9 years old) were included in this study. Bilateral knee flexor and extensor performances were assessed using a Cybex Norm dynamometer. Maximal isokinetic strength was measured at 60°/s (3 maximal repetitions) and 180°/s (5 maximal repetitions). Thereafter, patients performed a fatigue protocol consisting in 30 successive maximal-intensity knee flexions and extensions at 180°/s angular velocity. Fatigue was analysed using the cumulative work parameter (corresponding to the sum of work developed through the 30 movements) and a fatigue index (ratio between work developed during 3 last contractions and 3 first contractions). During a walking test (7.62 meter-long and 100 meter-long), walking speed was also measured in patients with MS.

Results

Isokinetic parameters (strength and fatigue) of knee flexors were significantly reduced in MS patients comparatively to control subjects. Knee flexors/extensors ratio was lower in MS patients. We measured a significant bilateral asymmetry in these patients, suggesting a predominance of weakness process in one inferior leg.

Significant correlations between walking speeds (7.62 and 100 meter-long) and hamstring isokinetic parameters (peak torque and cumulative work) were observed. For the isokinetic parameters of knee extensors, significant correlations were only reported with the walking speed measured during the 100 meter-long test.

Discussion and conclusion

Objective evaluation of muscle deficiencies in patients with MS appears essential for designing a successful rehabilitation program. However, no consensus has been established with regard to the most relevant isokinetic protocol modalities for assessing patients suffering form central nervous system lesions.

Our results underlined that walking speeds were correlated to isokinetic parameters (strength and fatigue). Interestingly, no patient included in our study reported increased symptoms such as spasticity during or after the test, indicating that MS patients are able to perform strength and fatigue isokinetic assessments.